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METHOD FOR IDENTIFYING AND DIRECTING AN ITEM, SUCH AS AN ENVELOPE OR PARCEL, WITHIN A LOGISTIC SHIPMENT NETWORK

The present invention relates to a method for identifying and directing an item, such as an envelope or parcel, within a logistic shipment network.

5 Systems for controlling shipments have already been proposed, as described for example in EP-1189163, which discloses a system that uses RFID transponders, i.e., uses their particular capabilities, described in the publications of the AIM association and in particular in a publication related to an analysis of RFID systems entitled "Draft Paper on the Character of RFID Systems", July 2000, "AIM Frequency Forums, AIM FF
10 2000:001, Ver. 1.0".

In the system described in this patent, the application of these RFIDs is linked to the individual item to be identified, giving it the function of an actual data bank that can be updated according to the passages that the transponder undergoes. The central system can be conceived as a core for comparing data A based on valid actions along the
15 logistic chain and data B that represent an actual logistic state and logistic actions that have actually been performed or are to be performed, so as to provide control over the corresponding variations. The carrier can optionally generate its own shipment data before entering them in the tag and then sending them to the central system.

The methods used in shipment companies that use computerized systems are
20 substantially identical to the ones proposed by the existing patent, since computerization is performed according to the same principles described in the introduction of the patent, with the difference that instead of using RFID transponders one uses simpler bar codes.

The system proposed by EP-1189163, i.e., revealing the tracking path of the individual item in the RFID that accompanies it, does not appear to be advantageous,
25 since to obtain a tracking path history it is sufficient to query the data stored in the central unit. This system, moreover, does not specify who can query the information contained in the tag and how this can be done.

Moreover, in EP-1189163 the tracking of the path of the item is updated in the transponder only if required in some passage. It is in fact described that if a component
30 of the logistic chain does not generate shipment data but uses shipment data already

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present in the tag for its own purposes, that component does not have to be provided with a read/write device and a reader device is sufficient.

In EP-1189163, the central system is connected at least to one communications network, be it the Internet, an intranet, a LAN, a WAN, et cetera, which merely acts as an
5 archive.

The system described in EP-1189163 is aimed at the statistical and static preservation of history data related to the tracking path of a given item, which can be in any unidentified and unidentifiable location.

The aim of the present invention is to provide a system that overcomes the
10 drawbacks of the cited known art.

Within this aim, an object of the invention is to provide a system that allows dynamic tracking, in real time, of a given item in any identified and identifiable moving or stationary location within an organized logistic chain.

Another object of the invention is to provide a system in which acquisition of the basic
15 data useful for shipping and identifying the item occurs in real time, updating a specific Web page, and in which the data can be queried, by browsing the dedicated page via the Internet, by the operators and users of the logistic network.

This aim and these and other objects that will become better apparent hereinafter are achieved by a method for identifying and directing an item, such as an envelope or
20 parcel, within a logistic shipping network, as claimed in the appended claims.

Further characteristics and advantages of the invention will become better apparent from the following detailed description of preferred but not exclusive embodiments thereof, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

25 Figure 1 is a circuit diagram of an RFID transceiver that constitutes the reader device;

Figure 2 is a diagram of the transponder label of the type that does not have an internal power source;

Figure 3 is a diagram of the transponder label of the type that has an internal power source;

30 Figure 4 is a diagram of the fixed or movable RFID identification device, with a dual

antenna and a GSM/GPRS/UMTS/WiFi/Bluetooth output;

Figure 5 is a view of a variation that includes a single Modem-GSM/GPRS/UMTS/WiFi/Bluetooth card;

Figure 6 is a diagram of the fixed RFID identification device, with a dual antenna and
5 an output on the ADSL/ISDN telephone network or with a wireless GSM/GPRS/UMTS/WiFi/Bluetooth network;

Figure 7 is a view of an envelope stamped with a transponder-label device without an internal power source;

Figures 8, 9 and 10 are respectively a rear view, a side view and a front view of the
10 transponder-label device without an internal power source;

Figure 11 is a schematic view of the steps of the operation of the method according to the invention;

Figure 12 is a partial cutout view of a collection container with a fixed dual-antenna RFID identification unit;

15 Figure 13 is a perspective view of a smart mailbox provided with a fixed dual-antenna RFID identification device with an output on the ADSL/ISDN Internet network or on a wireless GSM/GPRS/UMTS/WiFi/Bluetooth connection.

With reference to the cited figures, the system according to the invention includes RFID (Radio Frequency Identification Device) transceiver devices, designated by the
20 reference numeral 1, active transponders 2 and/or passive transponders 3, and uses a GSM/GPRS/UMTS/WiFi/Bluetooth network, the global Internet network, an embedded computer and a modem.

The RFID units are electronic devices for transmitting and receiving on various frequency bands.

25 A microtransmitter, known as transponder, which is extremely small and cheap, can be identified within a radius of 4-5 meters by another fixed device capable of querying it.

The "mobile" device, known as transponder, is capable of storing several items of information and can be written remotely by the identification device.

A transponder device 5 is placed on each item of goods in transit in the logistic
30 network, for example an envelope 4, as shown schematically in Figure 7.

Each area (whether movable or stationary) of the logistic network has a fixed RFID device, which in turn is connected to an embedded computer with a GSM/GPRS/UMTS/WiFi/Bluetooth card and a modem.

For example, Figure 12 illustrates a collection container 6 with a fixed dual-antenna
5 RFID identification unit 7; Figure 13 instead illustrates a smart mailbox 8 provided with a fixed RFID identification device 7 with a dual antenna and an output 9 on the ADSL/ISDN Internet network or on a wireless GSM/GPRS/UMTS/WiFi/Bluetooth link.

As shown schematically in Figure 11, in the method according to the invention, when an item is moved from the sender to the consignee, carried across the logistic network
10 with the most disparate means and deposited in various transit storage facilities, every time it moves a local RFID device identifies its passage, since the transceiver antennas are conveniently arranged on the gates of each area.

As soon as an RFID identifies a transponder of an item of goods leaving or entering its area, it produces, by means of the embedded computer, a data file, which is
15 transmitted via GSM/GPRS/UMTS/WiFi/Bluetooth and then sent to the mainframe of the global network, where the appropriately provided Website physically exists, generating a history archive of the movements of the given item of goods on a Web page that is appropriately prepared or generated automatically for each item of goods. It is instantly possible to know where the shipment is located. Moreover, inside sorting areas the RFID
20 system can be connected to a system of moving belts and sort thousands of goods, redirecting them to different areas or collection containers, making it unnecessary to perform human recognition and consequent manual sorting.

For logistic networks that perform pickup/delivery at the customer's address, a portable RFID system, as big as a mobile telephone, can recognize the presence of the
25 shipment provided with a corresponding transponder device and report to the central office, on the corresponding Web page, that pickup/delivery thereof has occurred in real time, even tracking the path from the hands of the customer to the vehicle, ready to receive the goods with the onboard RFID, and vice versa, all without human intervention.

Suitably trained customers can purchase the transponder labels beforehand and write
30 them with a suitable RFID reader connected to the port of their personal computer,

without generating printed labels, simply by moving even thousands of goods close to the RFID antenna, and entrust them to the shipment network. It is possible to perform shipments even without specifying their destination at the time of sending.

Interested parties, if they know the identification code of the corresponding transponder label, can, by using a computer and visiting the corresponding Web page, subsequently decide the destination over the Internet, since the RFID devices of the logistic network read and rewrite the transponders.

In a conventional mailing system, adhesive transponders can be purchased like stamps and replace them.

Once the mailing has been inserted, the RFID of the mailbox identifies the corresponding transponder and optionally writes the delivery address if the user did not do so by means of the device connected to the PC. Interested parties, over the Internet, can know instantly where their mailing is located or subsequently change its destination.

Moreover, the identification system allows highly automated home collection/delivery.

The courier or mailman in conventional logistic networks, when he goes out to collect/deliver mailings, by means of the mobile RFID system installed in his vehicle, already has an exact geographical path generated by the computer on board his vehicle by means of the GPS position, the geographical coordinates for goods collection/delivery, and according to the managed geographical area.

Once he has arrived at his destination, the goods can be delivered into the hands of the consignee or deposited in a suitable RFID digitally-enabled mailbox, which recognizes, by means of a dialog with the label-transponder, the correct consignee and can be provided with an LED that is visible to the courier and that when the mailing is moved close to a detector lights up, in the presence of many mailboxes, the correct mailbox of the consignee.

Once the mailing has been inserted in the RFID digitally-enabled mailbox, it communicates with the portable system of the courier, generating a "digital delivery/pickup receipt" or directly paying for the mailing in cash- on-delivery mode by way of a digital system.

The described system offers several advantages: it allows to send and deliver goods

with considerable efficiency and savings; it avoids the physical presence of the sender and/or consignee by virtue of the digitally-enabled mailbox; it spares the user of the service from having to produce tracked mail (registered mail, parcels, with registered-mail receipt) and from spending time at the offices of the logistic network to generate
5 receipts or bills or to collect goods that cannot be delivered without the physical presence of the consignee.

The system according to the invention allows to avoid goods held in store and not delivered due to momentary absence of the consignee.

The system further allows to protect privacy, since it is not necessary to apply any
10 conventional physical address of the consignee or sender to shipments, since the address can be replaced with the geographical coordinates of the consignee, which accordingly are present in the memory of the label-transponder.

Users, for example businesses, that generate a considerable volume of mail would not need to print on paper any addresses, receipts or other bottlenecks for shipments.

15 In practice it has been found that the invention achieves the intended aim and objects, a system having been provided which allows dynamic and real-time tracking of a given item in any identified and identifiable moving or stationary location within an organized chain of transport.

Differently for example from the system described in EP-1189163, in which the
20 application of the RFIDs is linked to the single item to be identified, giving it the function of a true data bank that can be updated according to the passages undergone by the transponder, in the system according to the present invention the transponder does not require history updates, since it identifies only the item.

In the present solution, these updates are transferred from each node of specific
25 competence into a central unit, which specifically handles the tracking path of each individual item, differently from the solution proposed by EP-1189163.

According to the present invention, updating in the central unit is performed automatically at each change of suitably equipped area.

According to the present invention, by using computers and dedicated software one
30 provides real-time trackability of every individual item by anyone, something that is not

provided by the known art.

Moreover, in the system according to the present invention, the acquisition of the basic data useful to identify the item occurs in real time, updating a specific Web page, and the data can be queried by browsing the dedicated page via the Internet. According
5 to the known art, instead, the central system is connected at least to one communications network, be it the Internet, an intranet, a LAN, a WAN, et cetera, which acts merely as an archive.

The present invention uses not only GPS technology but also GPRS (General Packet Radio Services) technology, as well as GSM, UMTS, Bluetooth and WiFi technologies,
10 and the use of GPS technology leads to the tracking of the path that is or can be followed by each individual courier as well as by the individual item.

According to the present invention, there is an acquisition of items in containers (computerized mailboxes) connected over the Internet, by means of which it is possible to accept items and program each individual transponder remotely, by virtue of access
15 on a dedicated Web page for each individual RFID, something that is not considered in the known art.

Further, according to the present invention, the courier assigned to collection/delivery of a given item receives any kind of information by means of a GSM set or, if there is no signal, by means of a Bluetooth system, both of which are options that are not
20 considered by the known art.

Differently from the systems of the prior art, which are aimed at statistical and static storage of historical data related to the tracking path of a given item, which can be in any unidentified and unidentifiable location, the goal of the present invention is dynamic and real-time tracking of a given item in any identified and identifiable moving or stationary
25 area within an organized transport chain.

Moreover, the present invention allows to reuse the same transponders several times for subsequent shipments, reducing logistic costs significantly with respect to optical bar codes.

The method according to the invention is susceptible of numerous modifications and
30 variations, within the scope of the appended claims. All the details may be replaced with

technically equivalent elements.

The materials used, as well as the dimensions, may of course be any according to requirements and to the state of the art.

CLAIMS

1. A method for identifying and directing an item, such as an envelope or parcel, within a logistic shipping network, comprising applying to an item to be shipped a transponder device that is suitable to transmit an item identification code to a series of
5 identification devices, constituted by transceivers that are arranged in key stationary and/or movable points of the logistic network and are connected by means of a data communications network to a data communications center that can be queried by means of a data communications network in order to know in real time the path and location of the item.
- 10 2. The method according to claim 1, characterized in that said transceiver devices are constituted by RFID (Radio Frequency Identification Device) transceiver devices.
3. The method according to claim 1 or 2, characterized in that each movable or stationary area of the logistic network has a fixed RFID device, which is in turn connected to an embedded computer provided with a modem and a
15 GSM/GPRS/UMTS/WiFi/Bluetooth card.
4. The method according to one or more of the preceding claims, characterized in that when an RFID identifies a transponder of an item of goods entering or leaving its area, it generates a data file by means of the embedded computer and transmits it via GSM/GPRS/UMTS/WiFi/Bluetooth to the global Internet network, generating a history
20 archive of the movements of the given item on a Web page that is prepared appropriately or generated automatically for each item, allowing to know instantly where the shipment is.
5. The method according to one or more of the preceding claims, characterized in that said RFID can be connected to a system of moving belts in order to sort thousands
25 of items, redirecting them to different collection containers or areas, making it unnecessary to perform human recognition and corresponding manual sorting.
6. The method according to one or more of the preceding claims, characterized in that in logistic networks that provide pickup/delivery at the customer's address, a portable RFID system, as big as a mobile telephone, can report to the central office on
30 the corresponding Web page that the shipment has been picked up/delivered in real

time, tracking the path from the hands of the customer to the vehicle, ready to receive the goods with the onboard RFID and vice versa, all without human intervention.

7. The method according to one or more of the preceding claims, characterized in that a user can purchase the transponder labels beforehand and entrust a shipment to the network without specifying its destination; if the identification code of the corresponding transponder label is known, by means of a computer, by visiting the corresponding Web page, the user can then decide the destination via the Internet, since the RFID devices read and rewrite the transponders.

8. The method according to one or more of the preceding claims, characterized in that the transponder can be provided in the form of a stamp in order to be used in a conventional mail system; once the mailing has been placed in a mailbox, an RFID in the mailbox being suitable to write and identify the mailing; the sender, via the Internet, being able to know instantly where his mailing is or to address it at a later time.

9. The method according to one or more of the preceding claims, characterized in that the courier or mailman, within a conventional logistic network, when he goes out to collect/deliver goods, by means of the mobile RFID system installed on his vehicle, already has an exact geographical route generated by the computer on board his vehicle by means of the GPS position, the geographical coordinates for shipment collection/delivery, and the managed geographical area; once he reaches the sender/addressee, the goods are collected/delivered from/into the hands of the sender/addressee or collected/deposited in a suitable RFID digitally-enabled mailbox, which recognizes the correct addressee by communicating with the label-transponder.

10. The method according to one or more of the preceding claims, characterized in that said RFID digitally-enabled mailbox has a luminous indication device, for example an LED, so that when the courier places the item close to a detector said LED lights up, if there are several mailboxes, the correct mailbox of the addressee.

11. The method according to one or more of the preceding claims, characterized in that said transponder device can be reused for subsequent shipments.

12. An apparatus for identifying and directing an item, such as an envelope or parcel, within a logistic shipment network, characterized in that it comprises a transponder

device that can be applied to an item to be sent and is suitable to transmit an identification code of the item to a series of identification devices, constituted by transceivers that are arranged in key stationary and/or mobile points of the logistic network and are connected by means of a data communications network to a remote
5 data processing center that can be queried by means of a data communications network in order to know in real time the path and location of the item.

13. The method according to one or more of the preceding claims, characterized in that it comprises one or more of the described and/or illustrated characteristics.

14. The apparatus according to one or more of the preceding claims, characterized in
10 that it comprises one or more of the described and/or illustrated characteristics.

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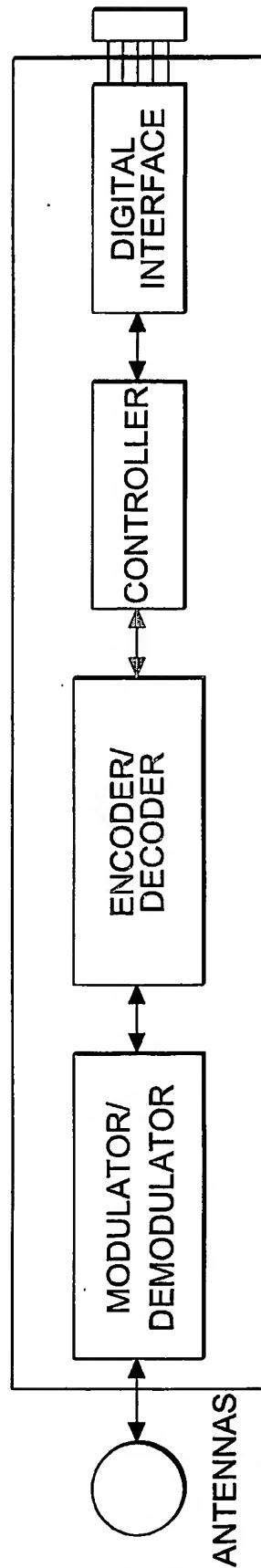


Fig. 1

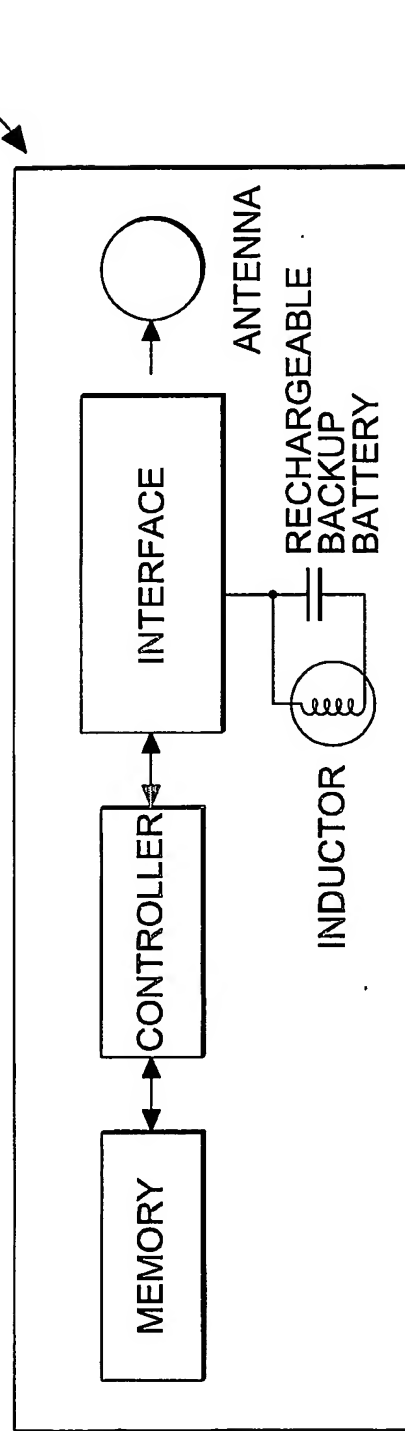


Fig. 2

2

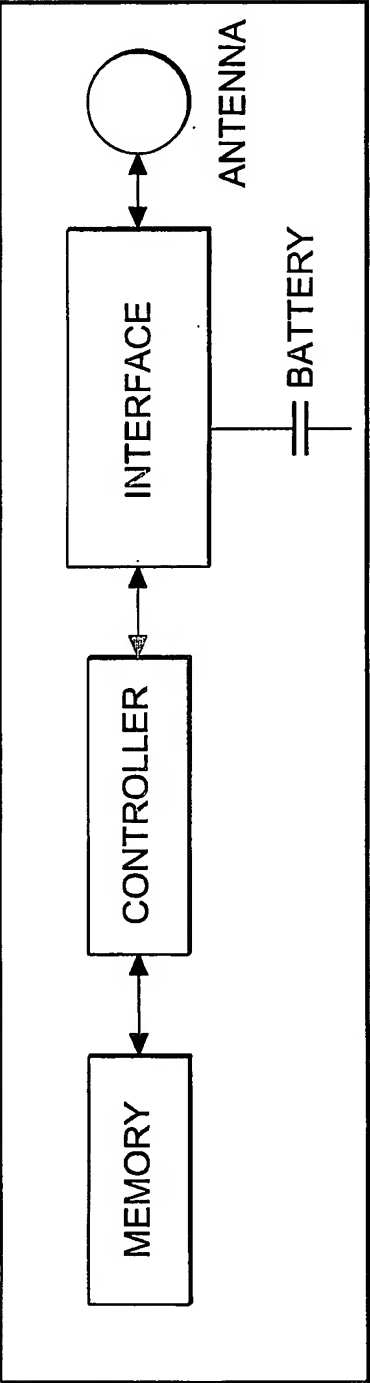


Fig. 3

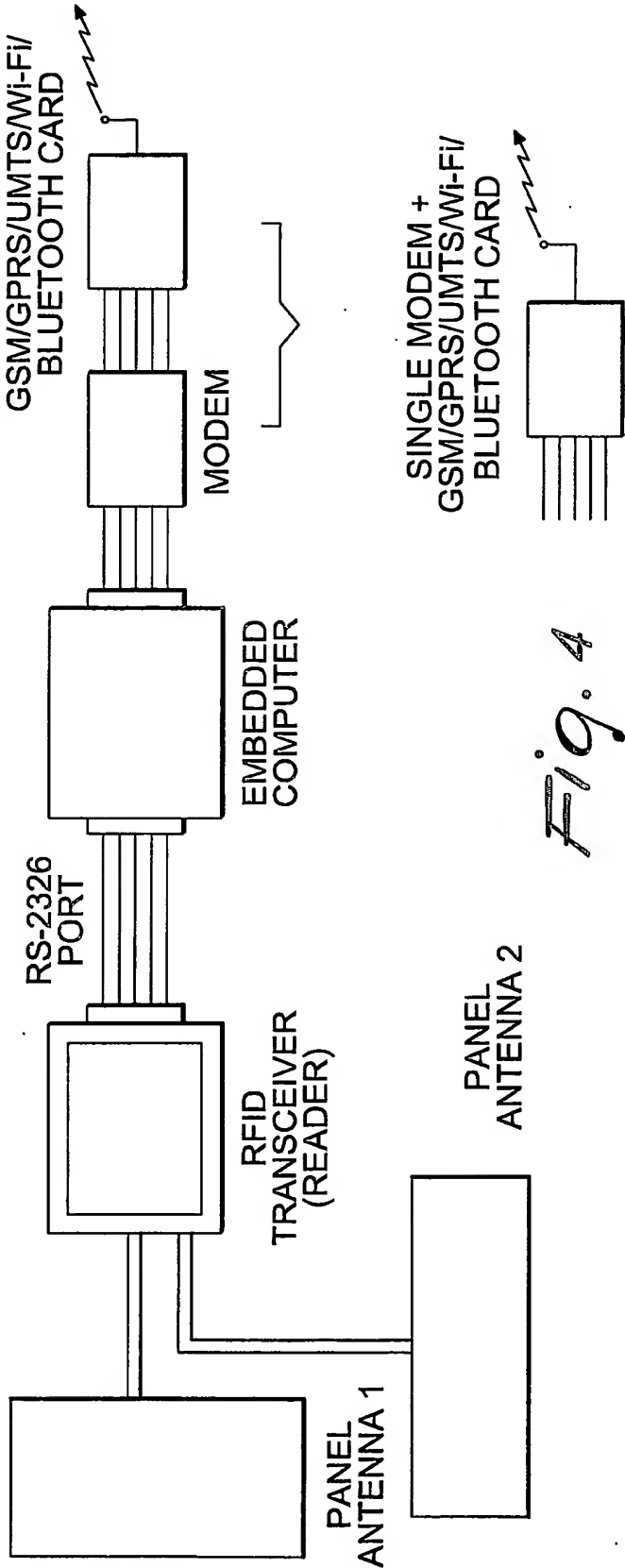
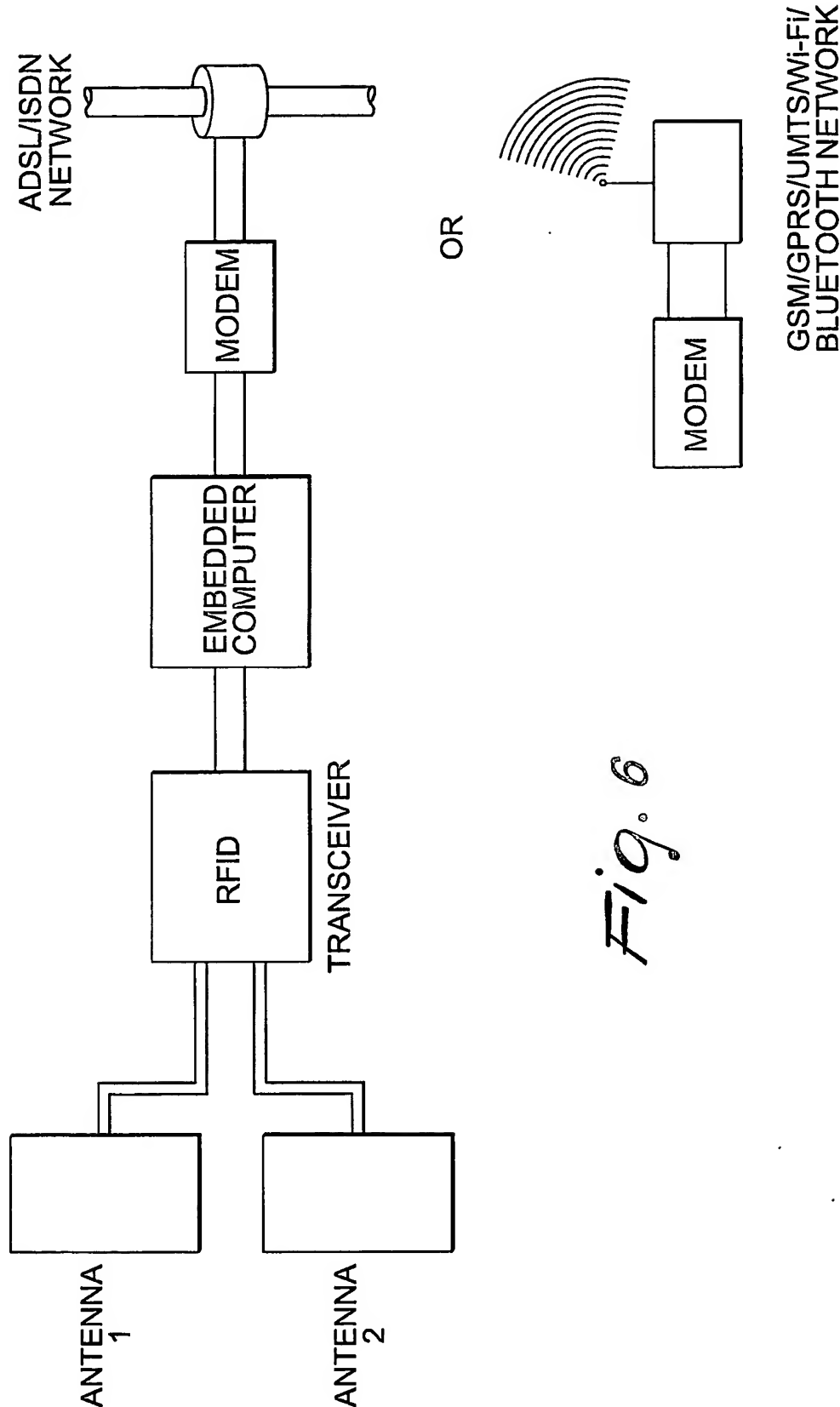
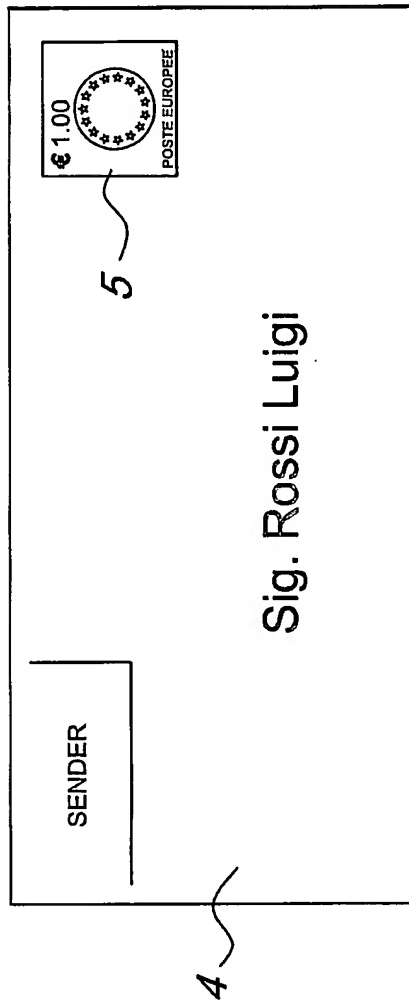


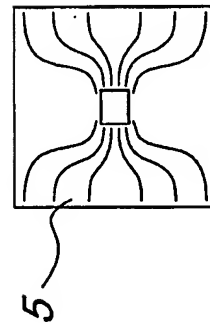
Fig. 4

Fig. 5

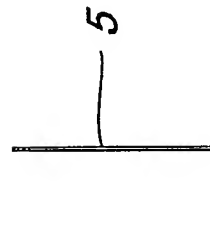




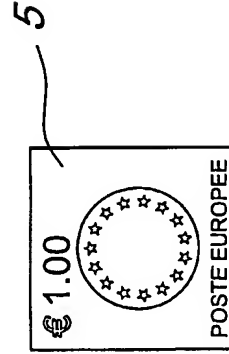
STAMPED LETTER



ADHESIVE
FACE WITH
CIRCUITS

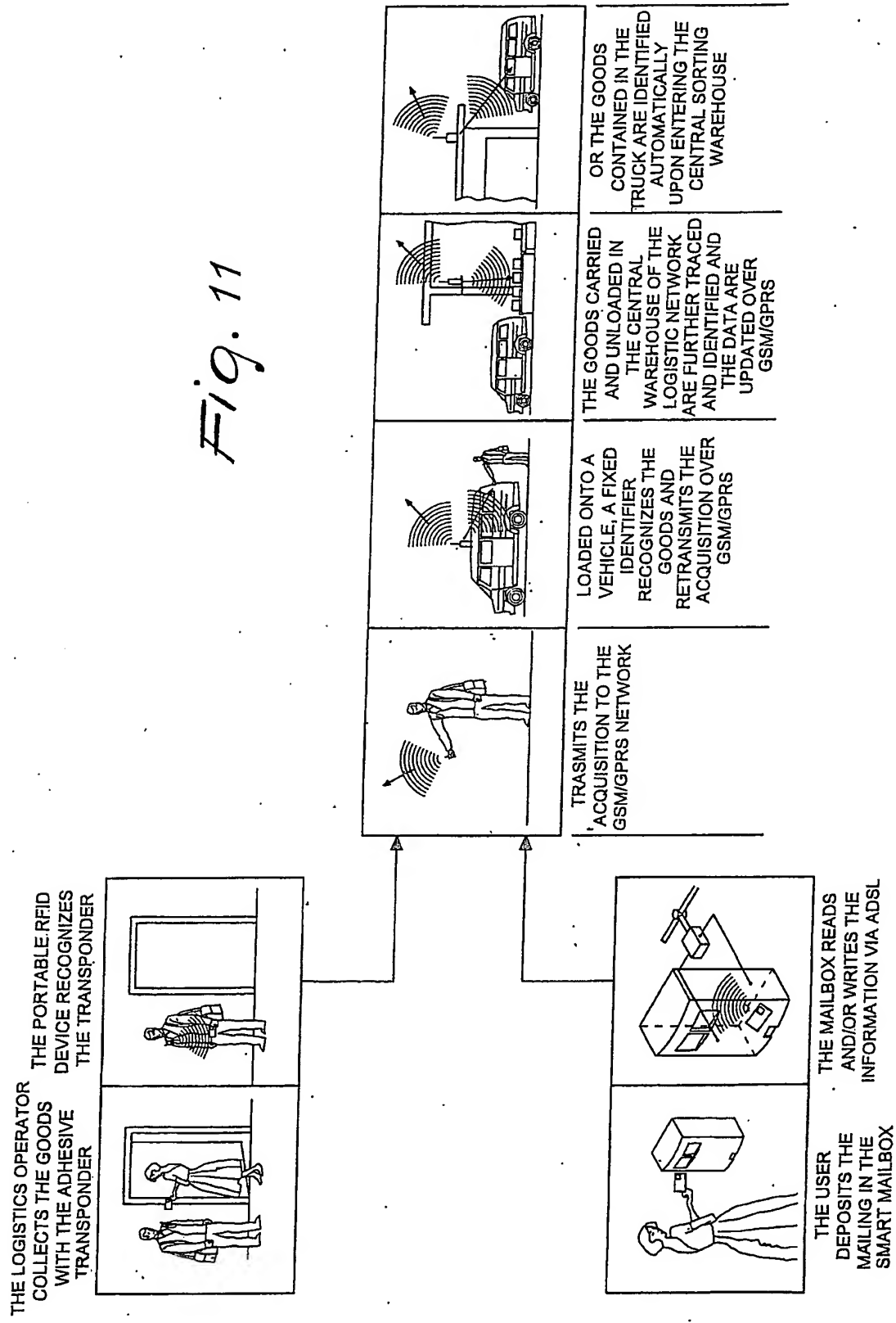


EDGE VIEW



COMMERCIAL
FACE AVAILABLE
TO SERVICE PROVIDER

Fig. 11



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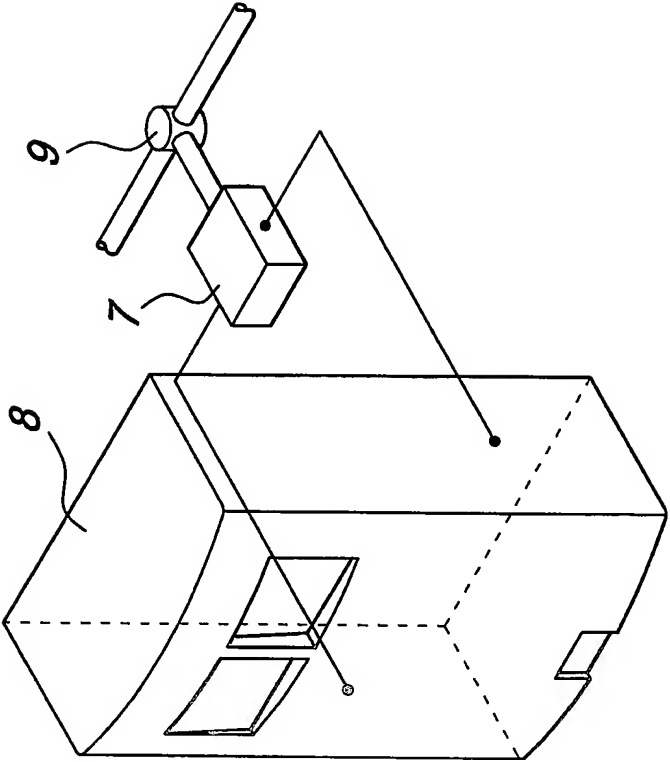


Fig. 13

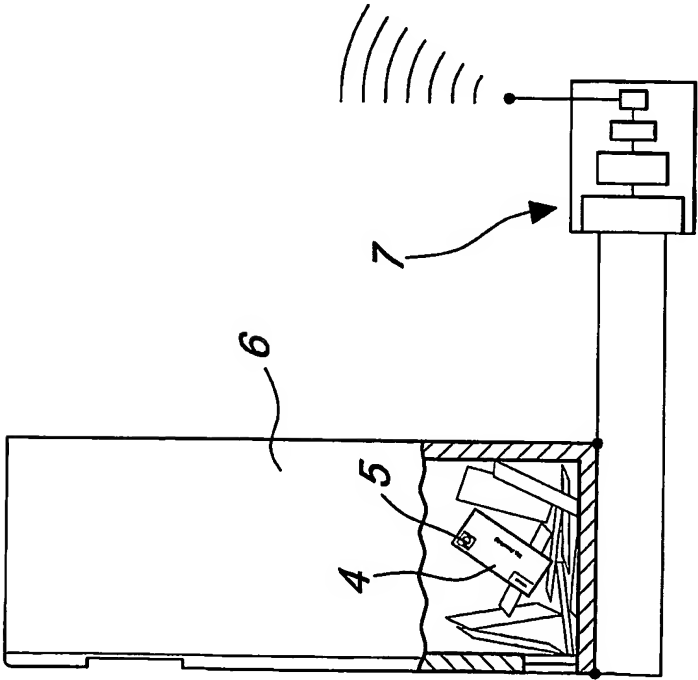


Fig. 12

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/001238

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F17/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 189 163 A (ESG ELEKTRONIKSYSTEM UND LOGIS) 20 March 2002 (2002-03-20) cited in the application	1-6,8,9, 11-14
Y	column 2, paragraph 6 - column 12, paragraph 38; figures 1-5 column 18, paragraph 64; figure 6 columns 19-20, paragraph 68 column 21, paragraph 73	7,10
Y	US 2002/165729 A1 (DOWLING WILLIAM J ET AL) 7 November 2002 (2002-11-07) page 1, paragraph 3; figure 2 page 2, paragraph 17-26 page 3, paragraphs 36,37 page 4, paragraph 43	7

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

16 July 2004

Date of mailing of the international search report

29/07/2004

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/001238

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6 318 636 B1 (REYNOLDS ANDREW E ET AL) 20 November 2001 (2001-11-20) column 12, line 38 - column 13, line 16; figures 2,11 -----	10
X	US 5 959 568 A (WOOLLEY LOUIS A) 28 September 1999 (1999-09-28) column 1, line 40 - column 14, line 20; figures 1-6 column 60, line 27 - column 26, line 64; figures 5,66 -----	1-6,8,9, 11-14
A	US 2002/185532 A1 (EISENBERG PETER M ET AL) 12 December 2002 (2002-12-12) page 2, paragraph 13 -----	10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/001238

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1189163	A	20-03-2002	DE 10043752 A1 EP 1189163 A2	14-03-2002 20-03-2002
US 2002165729	A1	07-11-2002	NONE	
US 6318636	B1	20-11-2001	US 2001045460 A1	29-11-2001
US 5959568	A	28-09-1999	AU 3582997 A CA 2258278 A1 WO 9749972 A2	14-01-1998 31-12-1997 31-12-1997
US 2002185532	A1	12-12-2002	CA 2447975 A1 EP 1393250 A2 WO 02101670 A2	19-12-2002 03-03-2004 19-12-2002